

App. No. 10/619,217
Office Action Dated August 23, 2004

REMARKS

Favorable reconsideration of this application is requested in view of the above amendments and the following remarks. Claims 1 and 4 are hereby amended. Claims 2 and 3 are canceled. No new matter has been added.

Claims 1, 2, 4-7 and 9 were rejected as being anticipated by McDearmon. Claim 1 is amended to include the matter of claims 2 and 3. Claims 2 and 3 are canceled. Applicant reserves the right to re-file cancelled claims. Claim 4 is amended to depend on claim 1. Support for the amendment for claim 1 can be found on page 2, line 32 through page 3, line 7. McDearmon teaches a different position of the sensor modules (strain gages). It is not apparent how an optical sensor could be fitted in such a restricted and narrow zone, at the interface between the bearing housing (4) and the cylindrical bore (18) of the suspension component C (figure 2). In contrast, the claimed invention optically detects deformation of the hub flange (7), which is directly attached to the wheel. This deformation is greater than that detectable at the bearing housing (McDearmon detection location) which provides for easier and more accurate detection of deformation. McDearmon states that the expansions and contractions of the bearing housing are minute (see column 6, line 20). Further, in the McDearmon arrangement, the forces and torques causing the deformation to be detected have to be transferred from the hub flange (26) to the bearing inner races (40), then to the rollers (54), and finally to the bearing housing (14). The deformation must follow a path through a kinematic chain constituted by different components moving with respect to one another. Whereas in the claimed invention, the forces and torques coming from the wheel are detected directly at the hub flange, by providing an optically reflecting surface (13) which is secured to or integral with the flange (7). Further, the considerable distance separating the reflecting surface (13) from the sensor measuring device (14) allows detection of slight elastic deformations that otherwise may not be sensed by the system. Thus the claimed invention provides a much higher accuracy in monitoring the loads acting on the hub and detecting, in real time, a condition of impending loss of adhesion between the tire and the road. Furthermore, this is accomplished with a standard type of hub-bearing unit, where there is little space available for fitting other devices.

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The claimed invention provides further differentiation from McDearmon in that it utilizes one measuring device per wheel, whereas McDearmon needs four sensor modules per wheel. The corresponding four sensor signals then have to be correlated and processed in order to obtain the deformation data. In light of the amendments made and dependencies to claim 1, please reconsider claims 1, 4-7, and 9 allowable.

Claims 3 and 4 were rejected as being unpatentable over McDearmon in view of Ouchi. Claim 3 is canceled. The applicant traverses the rejection of claim 4 in that McDearmon and Ouchi do not teach the concept of reflecting a beam of light in order to detect real time deformation of a radial hub flange. Ouchi only teaches a speed sensing bearing unit. This stationary device is intended to detect rotation of a portion (18) of a rotating tone wheel (16), which has light transparent portions (19) in the form of equally spaced slits.

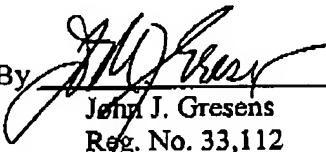
Claims 8 and 10 were rejected as being unpatentable over McDearmon in view of Ouchi, and further in view of Meeker. The applicant traverses these rejections as Meeker refers only to the mounting of a sensor to a braking system. It does not suggest the possibility of automatically adjusting the position of the brake pads.

In view of the above, and that the cited prior art does not disclose or suggest to monitor the deformation of the hub flange, or exploit the reflection of a beam of light, favorable reconsideration in the form of a notice of allowance is requested. Any questions regarding this communication can be directed to the undersigned attorney, John J. Gresens, Reg. No. 33,112, at (612)371-5265.

Respectfully submitted,

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